Another Investigation of Associative Factors in Reasoning

Charles N. Cofer, University of Maryland

Several previous studies in this series have been concerned with the influence of experimentally established verbal association patterns on reasoning. In general, as pointed out in reports #5,6,7,8, and 12, reasoning performance were affected by the association patterns set up. In one of these studies, association patterns already present in the subjects were also shown to influence performance in reasoning.

The influence of association patterns already present in the subjects on reasoning is a particularly interesting finding, since in everyday life it would be already existing patterns, rather than experimentally induced patterns, that would affect reasoning. For this reason, it has seemed desirable to investigate this problem further, and the present report gives the results of such a study. This investigation replicates an unpublished study conducted by A. J. Judson, the results of which will be cited below.

Method

The reasoning task employed was the familiar Maier two-string problem, which was presented in a pictorial form to groups of subjects who were asked to write out their solution to the task. This problem has been used in our previous studies, and the details of presenting and scoring this problem have been presented in report No. 5.

The two-string problem, briefly, asks the subjects to show how two strings, suspended from the ceiling, may be tied together. The strings are not long enough for the subjects to grasp one, walk over to the other and tie them together. In general, there are four types of solution: (1) lengthening one string by tying a cord to it; (2) anchoring one string by tying it as near to the other one as possible; (3) using a pole to "fish" for one string while the other one is held;

This is technical report #16 prepared under contract N7-onr-397, T.O. III, between the Office of Naval Research and the University of Maryland.

(4) pendulum solutions, in which a heavy object is tied to one string. This string is then set in motion, like a pendulum, and the subject catches it while holding on to the other string.

Since pendulum solutions are given less frequently than the others and presumably are more indicative of "productive" as compared to "unproductive" reasoning, the influence of past associative patterns on the frequency of pendulum type solutions was investigated. To obtain an index of past associative patterns, free associations were obtained to the following 9 stimulus words one week before the reasoning task was presented: rope, church, school, cord, poem, lamp, clock, ape, playground. It was assumed that if a subject responed to the word rope with the word swing or swinging or some variant thereof that he possessed a "swinging" association to rope or string which would facilitate the occurrence of pendulum type solution a week later.

The instructions given for the session in which associations were obtained and for the later session in which the reasoning task was attempted follow.

Instruction for the Free Association

We are asking you to take part in a psychological experiment today. It is designed to investigate some aspects of free association processes. Please do not turn over the sheet of paper that is to be distributed to you until I tell you to do so (distribute papers).

On this sheet of paper, you will see nine stimulus words. You are to give free associations to each of these words. By a free association I mean the first word that comes to your mind when you read the stimulus word. However, we want not merely one association to each stimulus word but 10. Each free association should be made to the stimulus word and not to words you have already associated. Please do not think about your associations but simply write down the words as they come to you. Are there any questions? Turn over papers and start. (15 minutes were given for this task.)

Instructions for the Two String Problem

The picture on the sheet of paper which we have passed out shows two strings suspended from the ceiling of a room. The problem on which we wish you to work today is to tie the ends of these two strings together. If you were to hold either string in your hand and walk over to grasp the other, you would be unable to reach the other one. But it is possible to tie the two together.

On the sheet of paper we have passed out you will see pictured various articles which you can use in solving the problem. Imagine yourself in a room faced with the problem. In the room are all the objects pictued on the sheet. You can use them in any way you wish in order to solve the problem. We want you to describe in writing all the solutions that you think of. There are a number of ways of solving the problem. Try to find as many of the solutions as you can. Furthermore, try to find different types of solutions, that is, solutions which employ different principles. Write the solutions you think of on a separate sheet of paper. Describe each solution as clearly as you can. Number each solution in order as you write it down. Write your name on the sheet containing your solutions.

You will have 10 minutes to work on this problem. Questions? Go.

Results

The free associations were examined, and all papers which contained swing associations were placed in one group. The the solution to the reasoning task were checked for pendulum solutions. A count was made of the number of pendulum solutions produced by the members of swing association group and by the members of the no swing association group. A further breakdown was made by sex. The results are shown in Table 1.

TABLE 1

Number and percentage of pendulum type solutions presented by the groups and the total number of Subjects.

	Pendulum Solutions	% of Cases	N
Swing association group	4	23	17
No swing association group	31	34	89
Females giving swing association	3	25	12
Females not giving swing association	8	20.5	47
Males giving swing association	1	20	5
Males not giving swing association	23	46	50

The results for the two major groups clearly fail to substantiate the hypothesis that pendulum type solutions would be more frequent in the swing association group than in the not swing association group. The results for women give slight, but insignificant support for the hypothesis. The number of cases in the swing association group for either sex is small as to make further analysis inappropriate.

These results are in marked contrast to those obtained in one experiment by Judson. Seventy percent of the 20 subjects in his swing association group gave pendulum type solutions as compared to 46 per cent in the no swing association group. His results were significant at about the .05 level of confidence. There is no evident reason for this disparity in results, although the present writer does not have information on the sex composition of Judson's groups. It is well known that males more frequently produce pendulum type solutions than do females, and the heavy proportion of females in the present swing association group may be a factor in the production of these negative findings. A further study will probably be necessary in order to resolve these differences.